

United States Environmental Protection Agency Washington, DC 20460				Work Assignment Number: <input checked="" type="radio"/> Original 0-6 <input type="radio"/> Amendment	
Work Assignment					
Contract Number: EP-C-09-027		Contract Period Base: 4/1/09 - 3/31/10 Option Period No.		SF Site Name:	
Title of Work Assignment: Impact of Green Building Products on Indoor Air Quality					
Suggested Source: ARCADIS		Specify Section & Paragraph of Contract SOW: 1.1, 1.2a, b, c, d, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 2a, b, c, d, e, f, g, 4, 5, 6a, b, c, d, and 7.			
Purpose: <input checked="" type="radio"/> Work Assignment Initiation Work Assignment Close-Out Work Assignment Amendment Incremental Funding Work Plan Approval		Period of Performance From: To: 4/1/09 - 3/31/10			
Comments: Continuation of WA4-06, contract EP-C-04-023, Option Period IV		QA Category (check one): <input type="radio"/> I Enforcement <input type="radio"/> II Standard Setting <input checked="" type="radio"/> III Technology Development <input type="radio"/> IV Proof of Concept <input type="radio"/> N/A			
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.					
SFO 22 Superfund (Max 2)		Accounting and Appropriations Data			
				Non-Superfund	
DCN (Max 6)	Budget/FYs (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)
				Amount	Sites/Project (Max 8)
					Cost Org/Code (Max 7)
1					
2					
3					
4					
5					
Authorized Work Assignment Ceiling					
Contract Period:		Cost/Fee		LOE	
Previously Approved		New			
This Action				0	
Total				225	
				225	
Work Plan / Cost Estimate Approvals					
Contractor WP Dated:		Cost/Fee:		LOE:	
Cumulative Approved:		Cost/Fee:		LOE:	
Work Assignment Manager Name: Mark Mason <i>Mark Mason</i> (Signature) 3/5/09 (Date)		Branch / Mail Code: IEMB / E305-03 Phone Number: (919) 541-4835 Fax Number: 919-541-2157			
Branch Chief Name: Robert C. Thompson, Chief, IEMB _____ (Signature) (Date)		Branch/Mail Code: IEMB / E305-03 Phone Number: 919-541-1904 Fax Number: 919-541-2157			
Project Officer Name: Diane Pierce _____ (Signature) (Date)		Branch/Mail Code: AOS / E343-01 Phone Number: (919) 541-2708 Fax Number: 919-541-1536			
Contracting Official Name: Renita Tyus <i>Renita Tyus</i> (Signature) 3/31/09 (Date)		Branch/Mail Code: CPAD Phone Number: 513-487-2094 Fax Number: 513-487-2109			
Contractor Acknowledgement of Receipt and Approval of Workplan (Signature and Title)					Date

Work shall not begin until 4/1/09

FY09 Scope of Work

WA Title: Impact of Green Building Products on Indoor Air Quality

1. Purpose

The overall objective of this project is to develop, demonstrate, and evaluate sustainable practices for indoor environments. Sustainable practices are decisions and actions that consider, minimize, and harmonize the impact of material and energy use on human health and the environment. Through integrated, multidisciplinary, and focused research, IEMB develops knowledge and tools that enable evaluation of sustainable practices for indoor environments. IEMB develops tools to characterize sources of indoor contaminants and investigates the relationships between sources of contaminants, the built environment and potential exposure to individual compounds and complex mixtures. For example, IEMB investigates the impact of green building products on indoor air quality and develops risk management options where green building practices or products may potentially improve or impair indoor quality.

2. Background

Rapidly increasing energy costs coupled with increasing market acceptance of “green” or sustainable residential building design has resulted in increased demand for sustainable building practices and “green” building products. However, sustainable “green” building practices (e.g., super insulated, tight buildings constructed with recycled or “natural” products) may inadvertently result in degraded indoor environmental quality or other downstream environmental challenges. As a component of “cradle to cradle” stewardship of materials and energy, there is a need to understand the impacts on the indoor environment of: emissions, sorption and re-emission of organic and inorganic compounds from “green” building materials (2) transport within the built environment, (3) efficacy of control technologies such as air and surface cleaning.

Key pollutants of concern include endocrine disrupting compounds such as brominated flame retardants, phthalates, and perfluorinated compounds associated with consumer products, neurotoxins such as elemental mercury released from the debris field of broken compact fluorescent light bulbs, and air toxics such as formaldehyde released and sorbed by numerous indoor materials and surfaces. Formaldehyde is one of the key toxic pollutants in the National Risk Management Research Laboratory (NRMRL) Indoor Air Strategic Plan. It is among the US Environmental Protection Agency (EPA) listed urban air hazardous air pollutants (HAPs) and one of the predominant VOCs emitted from building products. Primary emissions from materials and products as well as sorption and re-emission from surfaces are key factors that govern indoor concentrations. The sorption characteristics of wallboard significantly impact indoor concentrations of formaldehyde. However, this process is not well understood and the impact of “green” moisture resistant wallboard may alter the net sorption of formaldehyde, resulting in greater exposure to this known air toxic compound.

There are three components of IEMB's research approach: (1) Develop source models that simulate emissions from green building products, (2) develop sorption/re-emission models for green building products, and (3) determine the reliability of source/sink models in full-scale indoor environments. The source emissions model parameters obtained from EPA's chamber tests will be applied to IAQ models to determine the impact of the use of "green" design building products on indoor concentrations organic and inorganic contaminants. Source and sink models and control strategies will be evaluated by studies conducted in APPCD's Research Test House (RTH), operated by the contractor. Specific tasks and the schedule for tasks to be conducted in the RTH will be described in amendments to this work assignment or described in other task-specific work assignments.

3. Task Descriptions

The contractor shall conduct the following tasks:

The contractor shall: maintain the research house in ready mode for model evaluation or other studies as described in amendments to this work assignment or described in separate work assignments that utilize the research test house. Specifically, the contractor shall ensure that:

All miscellaneous and standard operating procedures (MOPs and SOPs) are accurate and up to date for contractor operated measurement or control systems. At a minimum, the contractor shall ensure that:

- The data acquisition system is functional
- At least two temperature sensors and two RH sensors are functional
- The B&K Multi-gas Analyzer is calibrated for SF₆
- The SF₆ dosing and sampling system is functional

Per section YY of the above referenced contract, the contractor shall maintain the instrumentation in the RTH to ensure that RTH can be utilized for specific research tasks within 30 days of notification through amendment to this or other work assignments.

The contractor shall provide technical input to QA test plans, addendums, technical reports, and manuscripts developed by EPA staff for and from specific experiments to be conducted in the research test house. Data gathering/manipulation shall not begin until the QAPP has been approved by the EPA QA Manager. The QA plan shall be developed according to the requirements in Attachment #1 to the Statement of Work. Specific experiments, schedules and deliverables will be described in amendments to this work assignment.

4. Reports

The contractor shall provide the EPA work assignment manager monthly progress reports as specified in the contract.

5. Schedule of Tasks, Reports, and Deliverables

Version 1.0

3/05/09

The contractor shall provide monthly reports of the RTH operational status. Reports and deliverables for other tasks, including new or revised MOPs or SOPs that are required to support QAPPs developed for specific research tasks to be conducted at the RTH, will be described in amendments to this work assignment.

6. Suggested Skills

This project will require contractor staff with the following skills: modification and adaptation of scientific apparatus to meet project objectives, sample collection and extraction, data processing and analysis, preparation, operation and maintenance of the RTH.

7. Special requirements

The contractor shall provide necessary health and safety procedures, documentation, and training to contractor staff to ensure safe conduct of the experiments at contractor controlled facilities.

**ATTACHMENT #1
TO THE STATEMENT OF WORK (SOW)**

NRMRL Quality Assurance (QA) Requirements

In accordance with EPA Order 5360.1 A2, conformance to ANSI/ASQC E4 must be demonstrated by submitting the quality documentation specified herein. All quality documentation shall be submitted to the Government for review. The Government will review and return the quality documentation, with comments, and indicate approval or disapproval. If the quality documentation is not approved, it must be revised to address all comments and shall be resubmitted to the Government for approval. Work involving environmental data collection, generation, use, or reporting shall not commence until the Government has approved the quality documentation. The quality documentation shall be submitted to the Government at least thirty (30) days prior to the beginning of any environmental data gathering or generation activity in order to allow sufficient time for review and revisions to be completed. After the Government has approved the quality documentation, the Contractor shall also implement it as written and approved by the Government. Any EPA-funded project/program may be subject to a QA audit.

TO BE SUBMITTED PRE-AWARD:

☐ **NRMRL=s Quality System Specifications:**

- (1) a description of the organization=s Quality System (QS) and information regarding how this QS is documented, communicated and implemented;
- (2) an organizational chart showing the position of the QA function;
- (3) delineation of the authority and responsibilities of the QA function;
- (4) the background and experience of the QA personnel who will be assigned to the project; and
- (5) the organization=s general approach for accomplishing the QA specifications in the SOW.

☐ **Quality Management Plan:** prepared in accordance with R-2 - EPA Requirements for Quality Management Plans (EPA/240/B-01/002) March, 2001, <http://www.epa.gov/quality/qs-docs/r2-final.pdf>

TO BE SUBMITTED POST-AWARD (mark all that apply):

☐ **NRMRL=s Quality System Specifications:**

- (1) a description of the organization=s Quality System (QS) and information regarding how this QS is documented, communicated and implemented;

- (2) an organizational chart showing the position of the QA function;
- (3) delineation of the authority and responsibilities of the QA function;
- (4) the background and experience of the QA personnel who will be assigned to the project; and
- (5) the organization=s general approach for accomplishing the QA specifications in the SOW.

☐ **Quality Management Plan:** prepared in accordance with R-2 - EPA Requirements for Quality Management Plans (EPA/240/B-01/002) March, 2001,
<http://www.epa.gov/quality/qs-docs/r2-final.pdf>

☐ **Category I or II Quality Assurance Project Plan (QAPP):** prepared in accordance with R-5 - EPA Requirements for QA Project Plans (EPA/240/B-01/003) March, 2001
<http://www.epa.gov/quality/qs-docs/r5-final.pdf>

☒ **Category III or IV QAPP:** prepared in accordance with applicable sections of the following NRMRL QAPP Requirements List(s) which is(arc) included in this attachment:

☒ **QAPP Requirements for Measurement Projects**

☐ **QAPP Requirements for Secondary Data Projects**

☐ **QAPP Requirements for Research Model Development and Application Projects**

☐ **QAPP Requirements for Software Development Projects**

☐ **QAPP Requirements for Method Development Projects**

☐ **QAPP Requirements for Design, Construction, and Operation of Environmental Technology Projects**

ADDITIONAL QA RESOURCES:

EPA=s Quality System Website: <http://www.epa.gov/quality/>

EPA=s Requirements and Guidance Documents: http://www.epa.gov/quality/qa_docs.html

(ATTACH APPROPRIATE QAPP REQUIREMENTS HERE)

NRMRL QAPP REQUIREMENTS FOR MEASUREMENT PROJECTS

GENERAL REQUIREMENTS: Include cover page, distribution list, approvals, and page numbers.

0. COVER PAGE

Include the Division/Branch, project title, revision number, EPA technical lead, QA category, organization responsible for QAPP preparation, and date.

1. PROJECT DESCRIPTION AND OBJECTIVES

- 1.1 Describe the process and/or environmental system to be evaluated.
- 1.2 State the purpose of the project and list specific project objective(s).

2. ORGANIZATION AND RESPONSIBILITIES

- 2.1 Identify all project personnel, including QA, and related responsibilities for each participating organization, as well as their relationship to other project participants.
- 2.2 Include a project schedule that includes key milestones.

3. SCIENTIFIC APPROACH

- 3.1 Describe the sampling and/or experimental design that will be used to generate the data needed to evaluate the projective objective(s). A description of the design should include the types and numbers of samples (including QC and reserve samples), the design of the sampling network, sample locations and frequencies, and the rationale for the design.
- 3.2 Identify the process measurements (e.g., flow rate, temperature) and specific target analyte(s) for each sample type.
- 3.3 Describe the general approach and the test conditions for each experimental phase.

4. SAMPLING PROCEDURES

- 4.1 Describe any known site-specific factors that may affect sampling procedures as well as all site preparation (e.g., sampling device installation, sampling port modifications, achievement of steady-state) needed prior to sampling.
- 4.2 Describe or reference each sampling procedure (including a list of equipment needed and the calibration of this equipment as appropriate) to be used. Include procedures for homogenizing, compositing, or splitting of samples, as applicable.
- 4.3 Provide a list of sample containers, sample quantities to be collected, and the sample amount required for each analysis, including QC sample analysis.
- 4.4 Specify sample preservation requirements (e.g., refrigeration, acidification, etc.) and holding times.
- 4.5 Describe the method for uniquely numbering each sample.

- 4.6 Describe procedures for packing and shipping samples, including procedures to avoid cross-contamination, and provisions for maintaining chain-of-custody (e.g., custody seals and records), as applicable.

5. MEASUREMENT PROCEDURES

- 5.1. Describe in detail or reference each process measurement or analytical method to be used. If applicable, identify modifications to EPA-approved or similarly validated methods.
- 5.2. If not provided in Section 5.1 or the referenced method, include specific calibration procedures, including linearity checks and initial and continuing calibration checks.

6. QUALITY METRICS (QA/QC CHECKS)

- 6.1. For each process measurement and analytical method, identify the required QC checks (e.g., blanks, control samples, duplicates, matrix spikes, surrogates), the frequencies for performing these checks, associated acceptance criteria, and corrective actions to be performed if acceptance criteria are not met.
- 6.2. Any additional project-specific QA objectives (e.g., completeness, mass balance) shall be presented, including acceptance criteria.

7. DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT

- 7.1 Identify the data reporting requirements, including data reduction procedures specific to the project and applicable calculations and equations.
- 7.2 Describe data validation procedures used to ensure the reporting of accurate project data.
- 7.3 Describe how the data will be summarized or analyzed (e.g., qualitative analysis, descriptive or inferential statistics) to meet the project objective(s).
 - 7.3.1 If descriptive statistics are proposed, state what tables, plots, and/or statistics (e.g., mean, median, standard error, minimum and maximum values) will be used to summarize the data.
 - 7.3.2 If an inferential method is proposed, indicate whether the method will be a hypothesis test, confidence interval, or confidence limit and describe how the method will be performed.
- 7.4 Describe data storage requirements for both hard copy and electronic data.

8. REPORTING

- 8.1 List and describe the deliverables expected from each project participant responsible for field and/or analytical activities.
- 8.2 Specify the expected final product(s) that will be prepared for the project (e.g., journal article, final report).

9. REFERENCES

Provide references either in the body of the text as footnotes or in a separate section.